The Journal of Research on the Lepidoptera 24(4):277-288, 1985(86)

A New Squash Borer from Mexico (Lepidoptera: Sesiidae)

Timothy P. Friedlander

2015 Fountain Avenue #27, Bryan, Texas 77801

Abstract. A new species of *Melittia* (Lepidoptera: Sesiidae) is described from southern Mexico. Females superficially resemble *M. snowii* Hy. Edwards in size and coloration, but males resemble small males of *M. grandis* (Strecker). This species is a borer of wild mesophytic squash vines at altitudes exceeding 1500 m. Scale patterns and colors, genitalia, egg morphology and hostplant usage are compared among the North American species of the genus.

Introduction

Eichlin (1975) provided brief descriptions of the species of *Melittia* Huebner (Sesiidae) in North America north of Mexico, with notes on their biologies (with maps, keys, and color figures). These moths feed on wild and cultivated squash and gourds (Cucurbitaceae, mainly *Cucurbita* spp.). Additional collecting in southern Mexico yielded another moth in the genus worthy of description, belonging with those already depicted by Eichlin.

After careful examination of all described New World *Melittia* (Friedlander, unpublished honors thesis, Oberlin College; Duckworth and Eichlin, 1973a, 1978), it was concluded that the taxon herein described represents a distinct species. It is a pleasure to name this new species after Thomas D. Eichlin, who provided training and assistance in my early studies in sesiid taxonomy.

The specimens were collected in mid-July of 1983 and 1984 in southwestern Mexico by members of the Department of Entomology, Texas A&M University, in 2 separate expeditions led by Dr. J. C. Schaffner. Initial collection turned up one newly emerged and mated female in Colima (9 mi. ne. Comala). Subsequent collecting in this part of Mexico yielded additional specimens of both sexes in association with the hostplant. The types (male holotype, female allotype; Jalisco, 5 km w. Atenquique, 11 July 1984) will be deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., and paratypes distributed equally among that collection, the insect collection at Texas A&M University and that of the UNAM in Mexico City.

Fig. 1. Adult male, holotype, dorsal view.
Fig. 2. Adult female, allotype, dorsal view.

Melittia eichlini new species **Friedlander**

Adult Male (Fig. 1): Wingspan 20-26 mm, including fringe on FWs; length of FW along costal margin 9-12 mm. Body length approximately 10-13 mm, from anterior bases of antennae to fringe of scales on last visible abdominal segment (8). Males appear as small male *M. grandis* (Strecker), but with virtually no orange scaling on either the abdomen or legs.

Head: Frons smooth-scaled, dark gray, with white scaling laterally to compound eyes, very dark gray shelf of scales attached under antennal bases, shelf projecting laterally of eyes; vertex with dark gray scales overlain with dark gray hair-scales emerging from occiput dorsally; occiput scales laterally behind eyes, white; **lateral ocelli** prominent, clear with finely granular surface, appearing whitish; **compound eyes** slightly concave (in outline) next to antennal bases, with golden sheen on dark gray background; **pilifers** coppery, covering base of naked, brownish orange haustellum; **haustellum** with about 6 pairs of evenly spaced setae laterally at base between labial palps; **labial palps** smooth-scaled above, rough below, white at base, becoming light yellow apically; dark gray to black hair-scales mixed apically and ventrally on last 2 segments; some dark gray scales mesally, forming a streak to tip; **antennae** each with approximately 50 segments, pectinate with clumps of long black ciliae on first 35 or so flagellar segments, scaled with dark gray above, unscaled below and on most of unciliated, reddish brown segments; tips of antennae small with dozen, projecting black setae; white scaling in patches at anterolateral bases of pectinations on middle 20 flagellar segments, yellow scaling posterolaterally in streak towards tip; basal segment (pedicel) scaled with white laterally and ventrally.

Thorax: Prothoracic collar smooth-scaled, dark gray with very dark gray, yellowish white-tipped scales dorsally, overlain with light yellow hair-scales; **mesothorax** similar dorsally, but with large dark gray scales overlying bases of FWs and metathorax, long gray and pale yellow hair-scales posterolaterally; **metathorax** similar dorsally, but with long whitish hair-scales laterally; thorax dark gray laterally beneath wings except (yellowish) white thoracic collar; **forelegs**: coxae dark gray and yellow anterodorsally, with white and dark gray scales at apex (over trochanters), femora yellow dorsally mixed with dark gray ventrally; tibiae and tarsi dark gray and yellow, banded (yellow basally, dark gray apically); epiphysis long, bare, reddish brown; terminal tibial spines black; **mesothoracic legs**: femora dark gray anteriorly, yellow dorsally with long (pale) yellow hair-scales ventrally; trochanters covered by smooth dark gray scales with a

few pale yellow scales mixed, long white hair-scales posteriorly; tibiae bushy-scaled with light yellow and dark gray mixed, brownish orange spines projecting through; terminal spurs long, dark gray basally, white apically, anterior one half length of posterior one; terminal spines long, black; tarsi dark gray scaled except yellowish white at bases of each segment giving banded appearance; short, dark reddish brown spines in rows ventrally; **metathoracic legs**: femora whitish with dark gray scaling mixed anterodorsally, with long whitish hair-scales ventrally; trochanters covered by smooth dark gray scales with a few white scales mixed, long white hair-scales posteriorly; tibiae and basitarsi rough-scaled with white dorsally, white bushy-scaled (dorso-)posteriorly, interrupted by similar black scales at level of mid-spurs; similarly black-scaled (ventro-) posteriorly, white scales (ventro-) anteriorly; puff of white scaling anteriorly at apex of tibiae; both pairs of spurs black-scaled with whitish near tip (tips bare), but rough-scaled with white (lateral spurs) or black (mesal spurs) ventrally; rest of tibiae banded white and dark gray as in mesothoracic legs; **forewing (FW)** dark gray-scaled overlain with very dark gray, yellowish white-tipped scales, fringe composed of long spatulate dark gray scales in 3 ranks (lengths); ventrally, dark gray apically with considerable light orange scaling basally, especially along veins; anal margin rolled down; **hindwing (HW)** scaled with dark gray on veins only and at ends of cells and bases of anal cells; fringe same as on FW; vein A1 broadly scaled; costal margin rolled up, with whitish scales dorsally; ventrally same but with orange scaling mixed anteriorly and pale yellow at anterior base.

Abdomen: Each segment dark gray-scaled overlain with very dark gray, yellowish white-tipped scales dorsally (in broad longitudinal stripe), posterior fringe of broad dark gray scales which reflect light at certain angles, emerging under row of brownish orange flat spines on visible segments 2-8 (these spines fit into sockets; see Naumann, 1977); pale yellow and gray hair-scales scattered dorsally, especially on segments 4-8; dark gray scaling (dorso-)laterally on segments 2-8, bordered with white on each segment posteriorly; dark gray and white mixed ventrally, invaded with whitish, especially laterally; posterior fringe scales pale gray on each segment; white at base laterally on segment 1; anal fringe dark gray dorsally, white ventrally (both mixed with the other somewhat).

Genitalia (Figs. 11-14): **Saccus** of moderate length, 1.3 mm; **valves** long, 1.9 mm, somewhat falcate with saccular fold, apices filled with black setae inwardly, long-scaled outwardly, each with inward basal pit; **uncus** bifid, with narrow "V"-shaped indentation, **socii** black-haired, the whole effect appearing like a flared cloven hoof; **aedeagus** long, 2.4 mm.

ADULT FEMALE (Fig. 2): Wingspan 22-24 mm, including fringe on FWs; length of FW along costal margin 9-12 mm. Body length approximately 11-14 mm, from anterior bases of antennae to fringe of scales on last visible abdominal segment (7). Superficially similar to *M. snowii* Hy. Edwards in size and coloration above, but with yellow below; with rough, light-tipped, dark gray scaling over FWs and body as in *M. grandis* (Strecker). Similar to male, but with following differences.

Head: Labial palps white at base, becoming brilliant orange-yellow apically; **antennae** scaled with dark gray above, mixed dark gray and yellow below; yellow scaling increases towards tip becoming a lateral pre-apical streak; some white scaling occurs mesodorsally about two-thirds towards tip for about 7 segments.

Thorax: Mesothorax dorsally with few pale yellow spatulate scales above bases of HWs and mixed laterally on metathorax; **metathorax** with long pale yellow

hair-scales laterally; thorax dark gray laterally beneath wings except (yellowish) white thoracic collar and a few yellow scales laterally in front of FWs; **forelegs**: coxae yellow anterodorsally, with white and dark gray scales at apex (over trochanters), femora yellow dorsally mixed with dark gray ventrally; tibiae and tarsi dark gray mixed with yellow dorsally with yellow ventrally, yellow decreasing apically to give a banded appearance (yellow basally, dark gray apically); terminal tibial spines black; coxae, femora mixed dark gray and pale yellow posteriorly; femora with posteroventral, long yellow hair-scales; tibiae yellow posteriorly; tarsi whitish ventrally; **mesothoracic legs**: femora yellow anterodorsally with long (pale) yellow hair-scales ventrally; trochanters covered by smooth dark gray scales with few pale yellow scales mixed, long white hair-scales posteriorly; tibiae bushy-scaled with yellow, brownish orange spines projecting through; terminal spurs long, dark gray basally, yellowish white apically with bare tips, anterior one half length of posterior one; terminal spines long, dark reddish brown with lighter tips; tarsi dark gray-scaled except yellowish white at bases of each segment giving banded appearance; **metathoracic legs**: femora yellow with dark gray scaling mixed anterodorsally, with long (pale) yellow hair-scales ventrally; trochanters covered by smooth dark gray scales with a few pale yellow scales mixed, long white hair-scales posteriorly; tibiae and basitarsi rough-scaled with yellow dorsally, vivid orange bushy-scaled (dorso-)posteriorly, interrupted by similar (bluish) black scales at level of mid-spurs; similarly black-scaled (ventro-)posteriorly, yellow scales bordered with orange (ventro-)anteriorly; puff of white scaling anteriorly at apex of tibiae; both pairs of spurs black-scaled with whitish near tip (tips bare), but rough-scaled with white (lateral spurs) or black (mesal spurs) ventrally; rest of tibiae banded yellowish white and dark gray as in mesothoracic legs, with brush of orange basally to white dorso-apically; **forewing (FW)** ventrally dark gray apically with more yellow antero- and orange posterobasally.

Abdomen: Vivid orange scaling (dorso-)laterally (in broad longitudinal stripes) on segments 2-7; dark gray ventrally, invaded with lightened mixture of orange, especially laterally; anal fringe dark gray dorsally, orange ventrally (both mixed with the other somewhat).

Genitalia (Fig. 15): **sternite 7** weakly sclerotized, composed of 2 longitudinal bands, each 2.2 mm long; **sclerite 8** divided dorsally, projecting anteromesally in 2 points length dorsally 0.8 mm; anterior apophyses 1.4-1.5 mm long, more than a dozen setae around posterior edge of sclerite; **post-ostiolar sclerite** relatively narrow, "U"-shaped with trailing ends dorsally like bicycle handlebars, concave in the direction of **ostium**; **ductus bursae** 2.7 mm long, membranous with small (0.3 mm long) sclerotized ring just posterior to ductus seminalis (1.3 mm beyond ostium); **bursa copulatrix** elongate (2.8 mm long by 0.9 mm at widest), the last one fourth slightly less wide, forming an indistinct lobe, such as seen on inflated, elongate balloons, bursa finely granular (no signum); sperm case inside elongate (1.9 mm) with stalk into ductus; **anal papillae** not heavily sclerotized, 0.6 mm long, hairy (long hairs 0.3 mm long), posterior apophyses 1.7-1.8 mm long; whole "ovipositor" extends 3.3 mm beyond posterior edge of tergite 7.

Egg (Figs. 4, 7, 8): Eggs typical of *Melittia* species (Chittenden, 1908; Eichlin, 1975; Williams, 1913), flat, lying on their sides, anterior pole with micropylar region facing laterally along long axis; oval in shape as viewed from above, having a rim around base (side by which they are fixed to a substrate such as a leaf blade); at most 1.00 mm long by 0.72 mm wide by 0.44 mm high at micropylar end; micropylar region round, flat (raised in some specimens at center into small button);

sculpture obscure, finely granular with a hint of hexagonal reticulation. As viewed with scanning electron microscopy (SEM), eggs measure roughly 0.8 mm long by 0.6 mm wide, punctated (aeropyles?), except along ventral rim and micropyle, with slightly raised polygonal network of ridges (most easily seen along external sides of rim and forming micropylar rosette); rim not flared, but undercut ventrally; micropylar rosette small, in 2-3 ranks with 5-8 petals centrally.

Range (Fig. 16): Southwestern Mexico from Jalisco to Michoacan at altitudes above 1500 m. Specimen data as follows: Colima: 9 mi. ne. Comala, July 17-18, 1983, Kovarik, Harrison, Schaffner [T. Harrison, collector], one female; Jalisco: 0.5 and 8 mi. w. junc. 54 & road to Parque Nacional Volcan de Colima, near Atenquique, 11-12 July 1984, Schaffner, Woolley, Carroll, Friedlander [T. Friedlander, J. Schaffner, collectors], 6 males, 2 females; Jalisco: 8 mi. s. Autlan, 8 July 1984, Schaffner *et al.* [J. Schaffner, T. Friedlander, collectors], 4 females. Suspected of belonging to this species, based on notes (Friedlander, unpub.), but not included in the type series: Michoacan: Morelia, 15 July 1956, R. & K. Dreisbach, 2 males, one female [Michigan State Univ. collection]; Michoacan: Carapan, 1 July 1963, W. A. Foster, one male [Univ. Calif., Berkeley collection]; Jalisco: 5 mi. w. Atenquique, 25 July 1963, J. P. Donahue, one female labelled "in copula" [Michigan State Univ. collection].

Hostplant: *Cucurbita sororia* Bailey (tentative determination by D. Decker and H. Wilson, Dept. Biology, TAMU), a mesophytic member of the squash genus. The hostplant was found in disturbed to cultivated situations in montane areas north of Colima, Mexico, at about 2000 meters. At the collection site south of Autlan, seedling plants were found growing on a recently cleared roadside hill, not at all obviously planted. Female moths were found flying in the immediate vicinity and eggs were found on the plants, both on the leaf blades and on the stem near the bases of the vines. Oviposition was observed. At the site northeast of Comala no moths were found in 1984, but the hostplant was abundant on both sides of the road for about a kilometer, and plants were seen growing in adjacent cultivated fields, in pure stands, as if they had been cultivated. Plants along the road to the Parque Nacional Volcan de Colima near Atenquique lined the road for a shorter distance and occurred in areas of habitation higher up the mountain. Male moths were observed on blades of squash leaves and also, rapidly flying over the plants. One mated pair was observed on a leaf blade, and another female was found resting on a leaf.

Discussion

This species is sexually dimorphic in coloration. Males are similar in size to those of *M. snowii*, but are similar to males of *M. grandis* in color, except that the orange of the latter is replaced by white. Females are similar in size and coloration to those of *M. snowii*.

A superficial color comparison of the female of *M. eichlini* with *M. snowii* (specimens from central Texas) revealed the following differences. *M. snowii* is everywhere lighter gray (and on the whole, grayer) with less contrast to the white-tipped scales. *M. eichlini* has contrasting white-tipped scales such as are found in *M. grandis*. The antennae of *M. snowii* are uniformly dark gray; the compound eyes are without a golden sheen;

the labial palps are white below. *M. eichlini* has light-colored scaling ventrally on the antennae, and has the white spots dorsomesally as do female *M. calabaza* Duckworth and Eichlin; it has eyes with a golden sheen and orange-yellow palps ventro-apically. *M. snowii* foreleg coxae are white dorsally and dark gray elsewhere; the femora are yellow-orange dorsally and dark gray elsewhere; the tarsi are not banded; orange replaces the yellow found on *M. eichlini* mesothoracic legs; there is no orange on the metatarsi. *M. eichlini* females have, on the whole, much more colorful legs. The dorsal gray abdominal stripe is narrower in *M. snowii*.

M. grandis is everywhere more orange, and is normally much larger than *M. eichlini*. The Arizona variety (female) of *M. grandis (hermosa* Engelhardt) has a continuous gray stripe down the center of the abdomen dorsally, but is alternating gray and orange at the sides.

Some female specimens of *M. snowii* retain orange scaling in the cells of the HW, much like the western race of *M. gloriosa* Hy. Edwards, but this trait is not expressed in *M. grandis*, or in the female specimens of *M. eichlini*.

Engelhardt's (1946) description of *M. snowii* states that the collar is "lustrous blue-black," which differs from the Texas specimens, as well as the new species, which have dark gray collars. The collar of *M. grandis* is mostly orange.

The genitalia of *M. eichlini* are the smallest of all, equaled only by those of *M. snowii*. Male genitalia (Figs. 11-14) are quite similar in form to those of *M. grandis*. There is a ridge on the *edge* of the valve opposite the sacculus which distinguishes *M. grandis* from *M. eichlini*. There are also slight differences in the shape of the uncus, which might better be attributed to differences in preparation of the genitalia for viewing, but which might hold true in long series. Genitalia of *M. snowii* have blunt valves with little saccular ridge development, and the uncus is broadly indented in the shape of a "U". Other members of the genus differ considerably in the shape of the uncus and/or valves (see: e.g., Duckworth and Eichlin, 1973b: Fig. 3).

In the female genitalia (Fig. 15) of *M. eichlini* the shape of the postostiolar sternite is like that found in *M. grandis* and *M. gloriosa*, different from the broad chevron found in both *M. snowii* and *M. calabaza* (Duckworth and Eichlin, 1973b: Fig. 6). *M. snowii* lacks the sclerotized ring of the ductus, found in the other species (only weakly indicated in *M. grandis*). The shape of the bursa in *M. eichlini* is more like that of *M. grandis* than other species, being up to 3 times as long as wide, whereas *M. snowii* has one only 2 times as long. *M. calabaza* and *M. gloriosa* have a bursa two and a half times as long as wide.

This species shares the character "split sternite 7" with *M. grandis*, a condition quite different than that found in *M. snowii* (whole, with weak indentation posteriorly), or in *M. calabaza* (whole, but weakly sclerotized in a longitudinal strip along median). *M. gloriosa* has a short, rounded

sternite 7.

The eggs of *M. eichlini* differ from other species mainly in size, being, on the average, slightly larger than those of *M. snowii*, but smaller than those of the other species. Hexagonal reticulations are more pronounced in *M. calabaza* and *M. cucurbitae* than in *M. eichlini*, but at the macroscopic level the eggs agree well in design with other *Melittia* (except *M. gloriosa*, which lacks the bottom rim).

As seen in the SEM micrographs, *M. snowii* eggs (Figs. 3, 9) are similar in size, perhaps slightly more elongate, than those of *M. eichlini*. The micropylar rosette is larger than in *M. eichlini*, clearly in 3 ranks, with 6 or 7 petals centrally. *M. grandis* eggs (Fig. 5) are similar in form but are more than one and a half times larger. *M. gloriosa* eggs are also larger, but these lack a rim. *M. calabaza* eggs (Figs. 6, 10) are more broadly oval and one and a third times longer, with flared rims. The polygonal reticulations are stronger than in the other species. The micropylar rosette is larger than in *M. eichlini*, in 3 ranks, with 6-9 petals centrally.

The known hostplant relationships of North American species of *Melittia* are shown in Table 1. There are at least 5 other species of *Melittia* in Mexico for which there is no documented host data.

M. snowii is a stem- and petiole-gall maker on a tap-rooted perennial gourd, the xerophytic *Cucurbita foetidissima* H.B.K. *M. grandis* and *M. gloriosa* are root-borers on the same plant, the latter having a wider host

Table 1. Known hostplant relationships among North American squash vine borers.

Melittia spp.	*Curcurbita* spp.; etc.
calabaza	*maxima**[1], *mixta*[1], *moschata**[1], *pepo**[1], *texana*[1]
cucurbitae	*[andreana]*[2], *[ecuadorensis]*[2], *[ficifolia]*[2], *maxima**[2-5], *mixta*[2], *moschata*[2-4], *[okeechobeensis]*[2], *pepo**[2-5], *texana*[2], *Echinocystis lobata*[3]
eichlini	*sororia*[1]
gloriosa	*foetidissima*[6-8], *palmata*[6,7], *Echinocystis fabacea*[6-8]
grandis	*foetidissima*[6,7]
snowii	*foetidissima*[6-8]

*preferred hosts

[1]Friedlander, unpub. data; [2]Howe and Rhodes, 1973; [3]Chittenden, 1908; [4]Howe, 1949; [5]Whitcomb and Garland, 1948; [6]Eichlin, 1975; [7]Engelhardt, 1946; [8]Williams, 1913.

range. *M. eichlini* is a stem-borer on a mesophytic species of *Cucurbita*, tentatively determined to be *C. sororia*. Members of the squash-vine borer complex (Becker and Eichlin, 1984) are stem-borers of cultivated squash, mainly in *C. maxima* and *C. pepo*.

It appears that *Melittia eichlini* is closest to *M. grandis* morphologically, and might be derived from its ancestors. Alternatively *M. grandis* could be directly derived from *M. eichlini*-like ancestors. In either case, a host species shift has taken place and either stem-boring or root-boring, respectively, should be considered a specialization.

Acknowledgments. I thank Dr. J. C. Shaffner for the opportunity to collect and describe this species. H. Wilson and D. Decker provided plant identifications. J. Ehrman of the Texas A&M University Electron Microscopy Center provided invaluable help with scanning electron microscopy; T. Stevens made the corresponding plates.

Literature Cited

BECKER, V. O. & T. D. EICHLIN, 1984. Correct name for the Neotropical squash-vine borer (Sesiidae: *Melittia*). J. Lepid. Soc. 38:13-14.

CHITTENDEN, F. H., 1908. The squash-vine borer. (*Melittia satyriniformis* Hbn.). U.S. Dept. Agric., Bur. Entomol. Circular No. 38, 2nd revise. 6 pp.

DUCKWORTH, W. D. & T. D. EICHLIN, 1973a. The type-material of North American clearwing moths (Lepidoptera: Sesiidae). Smithsonian Contrib. Zool. No. 148. 34 pp.

_____, 1973b. New species of clearwing moths (Lepidoptera: Sesiidae) from North America. Proc. Entomol. Soc. Washington 75:150-159.

_____, 1978. The type-material of Central and South American clearwing moths (Lepidoptera: Sesiidae). Smithsonian Contrib. Zool. No. 261. 28 pp.

EICHLIN, T. D., 1975. Clearwing moth borers of cucurbits. Nat. Pest Control Operator News 35:4-7.

ENGELHARDT, G. P., 1946. The North American clear-wing moths of the family Aegeriidae. Bull., Smithsonian Inst., U.S. Nat. Mus. 190. 222 pp.

HOWE, W. L., 1949. Factors affecting the resistance of certain cucurbits to the squash borer. J. Econ. Entomol. 42:321-326.

HOWE, W. L. & A. M. RHODES, 1973. Host relationships of the squash vine borer, *Melittia cucurbitae* with species of *Cucurbita*. Annals Entomol. Soc. America 66:266-269.

NAUMANN, C. M., 1977. Studies on the systematics and phylogeny of Holarctic Sesiidae (Insecta, Lepidoptera). Amerind Publ. Co. Pvt. Ltd., New Delhi. 208 pp. [Transl. f. German; Bonn. Zool. Monograph No. 1. 1971].

WHITCOMB, W. D. & W. J. GARLAND, 1948. Susceptibility of Cucurbitaceae to squash borer. Proc. Amer. Soc. Hortic. Sci. 51:445-447.

WILLIAMS, F. X., 1913. Notes on three Sesiidae (Lepidoptera) affecting the "Missouri gourd" (*Cucurbita foetidissima* H.B.K.) in Kansas. Kansas Univ. Sci. Bull. 8 (whole series, 18):217-220.

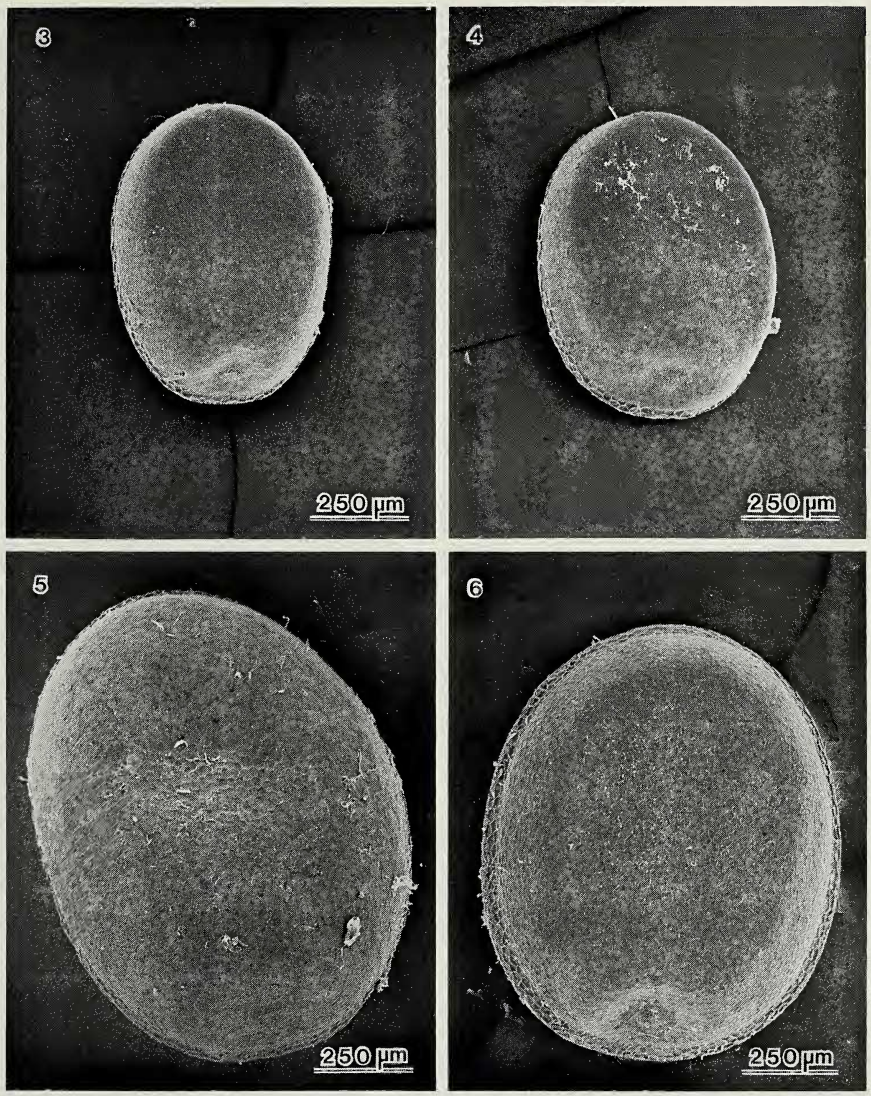


Fig. 3. Egg of *M. snowii*, upperside, view of micropylar end; note: basal rim, narrowing of micropylar end.

Fig. 4. Egg of *M. eichlini*, upperside, view of micropylar end; note: basal rim, broad oval outline.

Fig. 5. Egg of *M. grandis*, upperside, view of micropylar end; note: basal rim, rounded top.

Fig. 6. Egg of *M. calabaza*, upperside; note: broad basal rim, broad oval outline, flat top.

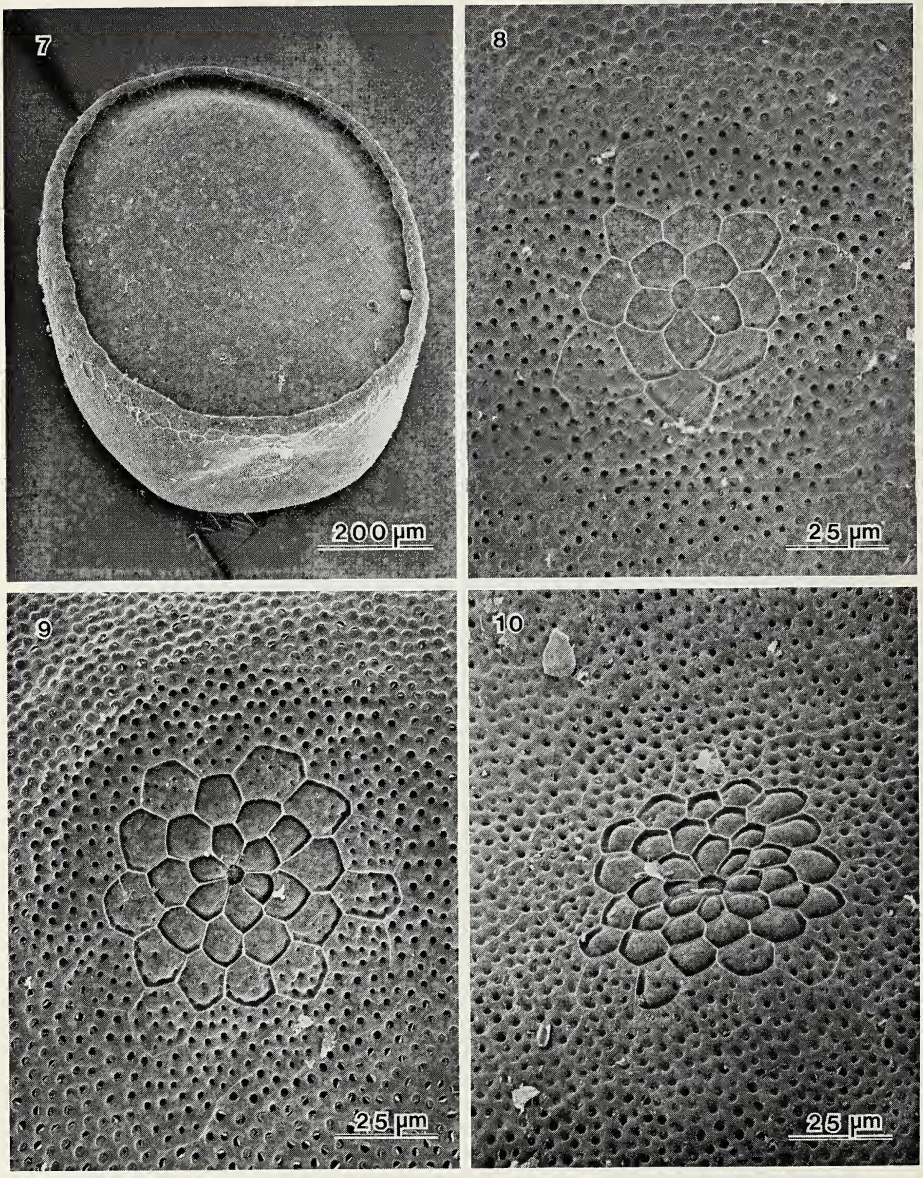
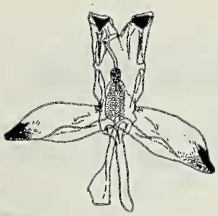


Fig. 7. Egg of *M. eichlini*, underside, view of micropylar end; note: rolled over rim.
Fig. 8. Egg of *M. eichlini*, micropyle; note 2 ranks of petals in rosette.
Fig. 9. Egg of *M. snowii*, micropyle; note: 3 ranks of petals in rosette.
Fig. 10. Egg of *M. calabaza*, micropyle; note: 3 ranks of petals in rosette.



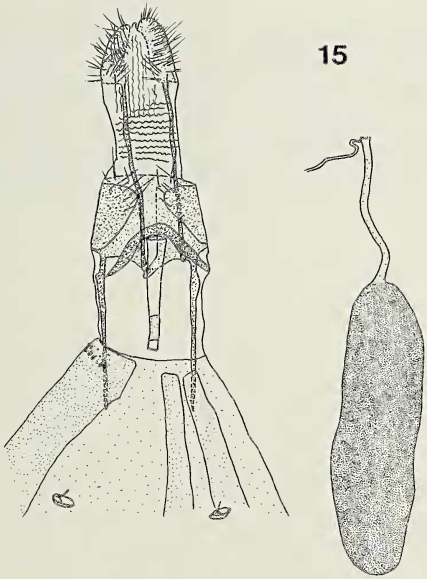
11

12

13

14

Fig. 11. Male genitalia, ventral view; valves spread.
Fig. 12. Left valve of male genitalia, inward view; note: absence of costal ridge (arrow).
Fig. 13. Dorsal view of uncus, male genitalia.
Fig. 14. Aedeagus of male genitalia.



15

Fig. 15. Female genitalia, ventral view; ductus bursae broken at level of ductus seminalis.

Fig. 16. Map of known distribution of *Melittia eichlini*.